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EXAMINER
HANNAHER, CONSTANTINE

ART UNIT	PAPER NUMBER
2878	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/677,040	**Applicant(s)** IANAKIEV ET AL.	
	Examiner Constantine Hannaher	**Art Unit** 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-59* is/are pending in the application.
  4a) Of the above claim(s) *59* is/are withdrawn from consideration.
5)☒ Claim(s) *14-23,26-31 and 58* is/are allowed.
6)☒ Claim(s) *1-5,8,11-13,24,25,32-37,39,42-44 and 51* is/are rejected.
7)☒ Claim(s) *6,7,9,10,38,40,41,45-50 and 52-57* is/are objected to.
8)☒ Claim(s) *1-59* are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a)☐ All b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
  Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

U.S. Patent and Trademark Office
PTOL-326 (Rev. 7-05) **Office Action Summary** Part of Paper No./Mail Date 20051007

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-58, drawn to a detector and associated method of detecting and method of manufacturing (including a plastic housing), classified in class 250, subclass 390.01.

   II. Claim 59, drawn to a method of manufacturing a radiation detector with an encapsulated metal enclosure, classified in class 445, subclass 44.

2. The inventions are distinct, each from the other because:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the process as claimed can be used to make another, materially different product such as a radiation detector with a ceramic encapsulation, and the product as claimed can be made by another process that does not specify "metal" as a material in its assembly (in view of conductive polymers and the like).

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with John P. O'Banion, Esq. (Reg. No. 33,201) on October 4, 2005 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-58. Affirmation of this election must be made by applicant in replying to this Office action. Claim 59 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

6. The disclosure is objected to because of the following informalities: paragraph [0053], zero used as element symbol; paragraph [0074], "does not substantially dependent".

Appropriate correction is required.

Because acceptable units generally have internationally recognized symbols and names, it is not permissible to use abbreviations for their unit symbols or names, such as sec (for either s or second), sq. mm (for either mm^2 or square millimeter), cc (for either cm^3 or cubic centimeter), mins (for either min or minutes), hrs (for either h or hours), lit (for either L or liter), amps (for either A or amperes), AMU (for either u or unified atomic mass unit), or mps (for either m/s or meter per second).

Note the use of cm sq. and ccm in paragraph [0078].

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 4 and 42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not describe a working gas which comprises a mixture and is also an element. As stated in paragraph [0012] these are alternatives.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 13, 24, 25, 37, and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the limitation "said processing electronics" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 12 establishes the processing electronics.

Claim 24 recites the limitation "said cover" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 14 establishes a top cover and a bottom cover.

Claim 37 recites the limitation "said housing" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 33 establishes the housing.

Claim 39 recites the limitation "said housing" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 33 establishes the housing.

The balance of the claims is rejected on the basis of their dependence.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the

contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1, 5, 8, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bersin *et al.* (US002968726A) in view of Kantor (US003654469A).

With respect to independent claim 1, Bersin *et al.* discloses a detector **10** (Fig. **3**) for detecting neutrons and gamma radiation (column 3, lines 59-62) comprising at least one cathode **17** defining an interior surface and an interior volume, a plastic housing **31** surrounding the cathode (column 6, lines 7-9), at least one lid **19** attached to the housing and enclosing the interior volume of the cathode **17**, at least one anode **20** extending from the lid **19** into the interior volume of the cathode **17**, at least one working gas disposed within the interior volume of the cathode **17** (column 5, lines 60-63), and at least one conductive neutron-capture layer **28** at least partially disposed on the interior surface of the cathode **17** (column 5, lines 46-48). The lid **19** in the detector of Bersin *et al.* is not plastic. Kantor shows (Fig. **2**) that in the art of ionization chambers which comprise a cathode **33** defining an interior volume and a plastic housing **32** (column 2, lines 2-9) it is known to provide a plastic lid **38** attached to the housing **32** to enclose the interior volume. Although Bersin *et al.* does not require a uniform thickness for the plastic housing (column 6, lines 9-11) it is apparent from the view that the metal lid **19** does not contribute any moderation for neutrons which may arrive from that direction, so it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector of Bersin *et al.* to have a plastic lid (which may retain a metal lining in accordance with the disclosure of Kantor to fulfill the purpose of lid **19**) attached to the housing **31** and enclosing the interior volume of cathode **17** such that neutrons were moderated regardless of the direction of incidence.

With respect to dependent claim 5, the conductive neutron-capturing layer **28** in the detector of Bersin *et al.* is a boron compound. The utility of ^{10}B in such a compound is so well known as to require no citation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the boric acid in the layer **28** was enriched in ^{10}B for the better reaction to neutrons achieved thereby.

With respect to dependent claim 8, Bersin *et al.* is silent on the attachment of lid **19** and Kantor would appear to illustrate bolts in attaching lid **38** to housing **32**, but the welding of plastic parts is sufficiently well known as to require no citation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the housing and lid suggested by Bersin *et al.* and Kantor were welded together, especially in view of the requirement to contain the working gas.

With respect to dependent claim 11, a high voltage bias source **40** is electrically connected to the cathode **17** in the detector of Bersin *et al.* (Fig. **5** and column 7, lines 4-8).

With respect to dependent claim 12, the detector of Bersin *et al.* further comprises processing electronics (Fig. **5**).

14. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bersin *et al.* (US002968726A) and Kantor (US003654469A) as applied to claim 1 above, and further in view of Menlove *et al.* (US006426504B1).

With respect to dependent claim 2, the plastic housing **31** in the detector of Bersin *et al.* is made from polystyrene, but Menlove *et al.* teaches (column 5, lines 24-33) that high density polyethylene is known for the same purpose of moderating neutrons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector of Bersin *et al.* to specify that the plastic housing **31** was made of HDPE as suggested by Menlove *et al.* in view of the art-recognized equivalence for the same purpose.

With respect to dependent claim 3, the plastic lid **38** suggested by Kantor is preferably made of something called "Mylar." Menlove *et al.* teaches (column 5, lines 24-33) that high density polyethylene is known for the purpose of moderating neutrons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector suggested by Bersin *et al.* and Kantor to specify that the plastic lid be made of HDPE as suggested by Menlove *et al.* to achieve consistent performance for the whole solid angle.

15. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bersin *et al.* (US2968726A) and Kantor (US003654469A) as applied to claim 1 above, and further in view of Goodings (GB001183718A).

With respect to dependent claim 4, as best understood, the working gas in the detector of Bersin *et al.* is hydrogen. Goodings teaches that in a neutron detector the working gas is one of the recited gases (page 1, lines 35-40) or a gas mixture exhibiting high stopping power (page 1, lines 79-81 and page 2, lines 3-5). In view of the stopping power and the faster collection time taught by Goodings, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector suggested by Bersin *et al.* and Kantor to specify that the working gas was as suggested by Goodings.

16. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bersin *et al.* (US002968726A) and Kantor (US003654469A) as applied to claim 1 above, and further in view of Reber *et al.* (US 20040262530A1).

With respect to dependent claim 13, as best understood, the processing electronics suggested by Bersin *et al.* and Kantor do not include logic for separating neutron pulses from gamma pulses. Reber *et al.* shows such logic **14** (Fig. **1**) for gas detectors (paragraph [0004]). In view of the utility of separating neutron pulses from gamma pulses (Fig. **4**) as taught by Reber *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the processing electronics in the detector suggested by Bersin *et al.* and Kantor to include logic as suggested by Reber *et al.*

17. Claims 32, 33, 43, 44, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bersin *et al.* (US002968726A) in view of Reber *et al.* (US 20040262530A1).

With respect to independent claims 32 and 44, Bersin *et al.* discloses a detector **10** (Fig. **3**) for detecting neutrons and gamma radiation (column 3, lines 59-62) comprising at least one cathode **17** defining an interior surface and an interior volume, at least one anode **20** extending from the lid **19** into the interior volume of the cathode **17**, at least one working gas disposed within the interior volume of the cathode **17** (column 5, lines 60-63), at least one conductive neutron-capture layer **28** at least partially disposed on the interior surface of the cathode **17** (column 5, lines 46-48), at least one high voltage bias source **40** electrically connected to the cathode **17**, and processing electronics (Fig. **5**). The processing electronics disclosed by Bersin *et al.* does not include logic for separately registering (or separating) neutron pulses from gamma pulses. Reber *et al.* shows such logic **14** (Fig. **1**) for gas detectors (paragraph [0004]). In view of the utility of separating neutron pulses from gamma pulses (Fig. **4**) as taught by Reber *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the processing electronics in the detector of Bersin *et al.* to include logic as suggested by Reber *et al.*

With respect to dependent claim 33, the detector of Bersin *et al.* further comprises a plastic housing **31** surrounding the cathode **17**.

With respect to dependent claim 43, the conductive neutron-capturing layer **28** in the detector of Bersin *et al.* is a boron compound. The utility of ^{10}B in such a compound is so well known as to require no citation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the boric acid in the layer **28** was enriched in ^{10}B for the better reaction to neutrons achieved thereby.

With respect to independent claim 51, Bersin *et al.* suggests a method for detecting neutrons and gamma radiation (column 3, lines 59-62) corresponding to the illustrated detector **10** (Fig. **3**) which would comprise the steps of providing its elements: at least one cathode **17** having an interior surface and an interior volume; a plastic housing **31** around the cathode **17**; at least one anode **20** extending into the interior volume of the cathode **17**; at least one working gas disposed within the interior volume of the cathode **17** (column 5, lines 60-63); at least one conductive neutron-capture layer **28** at least partially disposed on the interior surface of the cathode **17** (column 5, lines 46-48); at least one high voltage bias source **40** electrically connected to the cathode **17**; and processing electronics (Fig. **5**). The processing electronics disclosed by Bersin *et al.* does not include logic for separately registering (or separating) neutron pulses from gamma pulses. Reber *et al.* shows such logic **14** (Fig. **1**) for gas detectors (paragraph [0004]). In view of the utility of separating neutron pulses from gamma pulses (Fig. **4**) as taught by Reber *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the processing electronics in the method of Bersin *et al.* to include logic as suggested by Reber *et al.*

18. Claims 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bersin *et al.* (US002968726A) and Reber *et al.* (US 20040262530A1) as applied to claim 33 above, and further in view of Kantor (US003654469A) and Menlove *et al.* (US006426504B1).

With respect to dependent claim 34, the plastic housing **31** in the detector of Bersin *et al.* is made from polystyrene, but Menlove *et al.* teaches (column 5, lines 24-33) that high density polyethylene is known for the same purpose of moderating neutrons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector of Bersin *et al.* to specify that the plastic housing **31** was made of HDPE as suggested by Menlove *et al.* in view of the art-recognized equivalence for the same purpose.

With respect to dependent claim 35, the lid **19** in the detector of Bersin *et al.* is not plastic. Kantor shows (Fig. **2**) that in the art of ionization chambers which comprise a cathode **33** defining an interior volume and a plastic housing **32** (column 2, lines 2-9) it is known to provide a plastic lid **38** attached to the housing **32** to enclose the interior volume. Although Bersin *et al.* does not require a uniform thickness for the plastic housing (column 6, lines 9-11) it is apparent from the view that the metal lid **19** does not contribute any moderation for neutrons which may arrive from that direction, so it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector of Bersin *et al.* to have a plastic lid (which may retain a metal lining in accordance with the disclosure of Kantor to fulfill the purpose of lid **19**) attached to the housing **31** and enclosing the interior volume of cathode **17** such that neutrons were moderated regardless of the direction of incidence.

With respect to dependent claim 36, the plastic lid **38** suggested by Kantor is preferably made of something called "Mylar." Menlove *et al.* teaches (column 5, lines 24-33) that high density polyethylene is known for the purpose of moderating neutrons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector suggested by Bersin *et al.* and Kantor to specify that the plastic lid be made of HDPE as suggested by Menlove *et al.* to achieve consistent performance for the whole solid angle.

With respect to dependent claim 39, as best understood, Bersin *et al.* is silent on the attachment of lid **19** and Kantor would appear to illustrate bolts in attaching lid **38** to housing **32,** but the welding of plastic parts is sufficiently well known as to require no citation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the housing and lid suggested by Bersin *et al.* and Kantor were welded together, especially in view of the requirement to contain the working gas.

19. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bersin *et al.* (US2968726A) and Reber *et al.* (US 20040262530A1) as applied to claim 32 above, and further in view of Goodings (GB001183718A).

With respect to dependent claim 42, as best understood, the working gas in the detector of Bersin *et al.* is hydrogen. Goodings teaches that in a neutron detector the working gas is one of the recited gases (page 1, lines 35-40) or a gas mixture exhibiting high stopping power (page 1, lines 79-81 and page 2, lines 3-5). In view of the stopping power and the faster collection time taught by Goodings, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detector suggested by Bersin *et al.* and Reber *et al.* to specify that the working gas was as suggested by Goodings..

Allowable Subject Matter

20. Claims 6, 7, 9, 10, 38, 40, 41, 45-50, and 52-57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. Claims 14-23, 26-31, and 58 are allowed.

22. Claim 24 and 25 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

23. Claim 37 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

24. The following is a statement of reasons for the indication of allowable subject matter: with respect to claims 6, 7, 37, and 38, in combination with the elements recited, electrostatic shielding over the housing elements is not suggested; with respect to claims 9, 10, 40, and 41, in combination with the elements recited, a feed-through extending from the lid into the volume is not suggested; with respect to claims 14-31, in combination with the elements recited, the array of cathodes oriented as specifically recited is not suggested; with respect to claims 45-50 and 52-57, these steps are not suggested; with respect to claim 58, although Genrich *et al.* (US004543483A) teaches the manufacture of a plastic body and lid by injection molding (column 4, lines 12-17) and may be suggestive in combination with the detector structure suggested by Bersin *et al.*, the specific requirement of a ^{6}Li foil is not suggested.

Conclusion

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (571) 272-2437. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov/. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Constantine Hannaher
Primary Examiner